

Remarks

Applicant has filed this paper in response to the Office Action dated October 23, 2003. Claim 16 has been amended and new claims 17-18 added. Claims 1-18 are currently pending. Reexamination and reconsideration are respectfully requested.

Claims 1-16 were rejected by the Examiner under 35 U.S.C. 103(a) as unpatentable over U.S. Patent Application Publication No. 2002/0022366 A1 to Cabral, Jr. et al. (hereinafter "Cabral"), in combination with of U.S. Patent No. 5,780,889 to Hu et al. (hereinafter "Hu") and U.S. Patent Application Publication No. 2001/0029067 A1 to Hirano (hereinafter "Hirano"). The rejection is respectfully traversed.

It is respectfully submitted that the Examiner's basis for the combination of references is deficient and that the rejection of the claims based upon this improper combination should be withdrawn.

Applicant thanks the Examiner for the interview held on January 15, 2004. The cited art was discussed, and applicant explained that the references were improperly combined and the rejection should be withdrawn. Some of the claim elements, including those related to the SOI thickness, the applied voltage, and the impurity concentration were generally discussed. Agreement on the claims was not reached but the Examiner agreed to further consider applicant's remarks regarding the combination of references.

The Examiner appears to have cited Cabral as teaching a semiconductor device including a SOI film having a thickness that "is 0.003 μm or greater and 0.1 μm or smaller." Office Action at page 3. Applicant notes that Cabral appears to relate primarily to a multi-step process for forming a salicide structure for forming low resistivity contacts. The Examiner then conceded that "Cabral, Jr. fail to teach a power supply voltage and an SOI impurity concentration." Office Action at page. 3.

The Examiner then applied Hu as teaching a power supply voltage of 0.6 V. Applicant notes that Hu appears to be directed towards certain devices having a particular doping profile, which can operate at a voltage of 0.6 V or less. Hu at col. 1, lines 18-19. The particular doping profile may be achieved using multiple doped wells of different concentrations and dopant types.

See Hu claims. There is no suggestion in Hu of its relevance to or use with a salicide structure such as recited in Cabral.

Applicant further notes that the Examiner stated that it would be obvious "to modify the power supply voltage of Hu et al. . . ." Office Action at page 3. However, applicant notes that Hu expressly recites that its teachings are applicable to device which can operate at 0.6 V or less. Thus it appears that Hu teaches away from the use of higher voltages such as 0.8 V and 1.0 volts, as recited in claims 6-10 (0.8 V) and claims 11-15 (1.0 V).

The Examiner applied Hirano as teaching "an impurity concentration of an SOI film in the order to magnitude of $10^{17}/\text{cm}^3$." Office Action at page 3. Applicant notes that Hirano at page 3, paragraph 50, describes the use of a SOI layer having "a thickness of several thousand angstroms (e.g., 2,000 Å)," which is substantially thicker than that recited in the present claims and far outside of the thickness of the SOI layer the Examiner cited in Cabral (30-1000 Å). Moreover, while the Examiner cited Hirano paragraph 63, for its disclosure relating to impurity concentration, Hirano also teaches the use of different impurity concentrations, such as those recited in paragraph [0054], for example.

In an attempt to justify the proposed combination of references, the Examiner stated on page 4 of the Office Action that it would be obvious "to modify the semiconductor device of Cabral. Jr. et al. with the power supply voltage of Hu et al. and the SOI impurity concentration of Hirano to reduce contact resistance (page 5, paragraph [0065])." Hirano at page 5, paragraph 65 recites the following: ". . . a high-concentration impurity region is formed in the upper surface of the SOI layer which is exposed by the opening of the contact hole. This reduces contact resistance between the conductor which fills the contact hole and the body region." The high-concentration impurity region referred to in paragraph [0065] of Hirano does not appear to be the $10^{17}/\text{cm}^3$ region (paragraph [0063], Fig. 15) cited by the Examiner against the claims. Instead, the high-concentration impurity region appears to refer to the "high concentration impurity region 30" described in paragraph [0063], which has an impurity concentration of $1 \times 10^{20} \text{ cm}^{-3}$. Thus, the Examiner's basis for the combination of references is flawed. According to the Examiner's basis for the combination, it would be obvious to form a high-concentration impurity region having an impurity concentration of $1 \times 10^{20} \text{ cm}^{-3}$ as in Hirano. However, applicant's claims

recite a substantially different impurity concentration. As a result, the rejection should be withdrawn.

Applicant respectfully submits that the Examiner appears to be impermissibly using hindsight, that is, using the present applicants' disclosure to provide a motivation for combining the references, which motivation is wholly lacking from the Examiner's citations to the references.

The Examiner did not appear to establish why one of ordinary skill would only combine certain features of the references and whether such a combination would likely be successful. For example, the Examiner cited no portion of the art that explains why one would choose to combine the specific impurity concentration cited by the Examiner in Hirano with Cabral and not also combine other features of Hirano, such as the thickness of the SOI layer, with Cabral. Moreover, as noted above, the Examiner's basis for combining Hirano with the other references appears to be deficient. Absent specific guidance, one of ordinary skill would not know which features of Hirano should be combined with Hu and Cabral. The only basis the Examiner has provided for the selected features to combine is that the features are found in applicant's disclosure and claims.

In sum, applicant respectfully submits that the Examiner has not met the proper burden to establish a reasonable suggestion or motivation for the proposed modifications and combination of references. As stated by the Federal Circuit, "particular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed." *In re Kotzab*, 217 F.3d 1365, 1371, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). The Examiner's comments and citations regarding ranges and general conditions of a claim do not rise to the level of the particular findings why the skilled artisan would make the proposed combination in this case because the general conditions of the claims do not appear to be found or suggested in a cited reference. Instead, the Examiner appears to have used the present application as a roadmap and picked individual features that are found in unrelated aspects of three different references and combined these features in order to attempt to reconstruct the claimed invention. Absent evidence to indicate that one of ordinary skill would have a logical reason (other than hindsight based on the disclosure and claims of the present

application) to make the specific proposed combination, and evidence to indicate a likelihood that that references can be successfully combined as suggested, the Examiner's rejection is improper.

To establish a prima facie case of obviousness, there should be a suggestion or motivation in the art to modify the reference or to combine reference teachings, there should be a reasonable expectation of success, and the reference(s) must teach all the claim limitations. MPEP section 706.02(j). Applicant respectfully submits that as discussed above, Examiner's citations to the art are insufficient to satisfy the criteria above. For at least the above reasons, the rejection of claims 1-16 should be withdrawn.

Applicant further notes that with respect to dependent claim 16, the Examiner cited Hirano and stated that "Hirano further teaches . . . first and second low concentration diffusion regions 7N & 7P . . . , wherein a portion of each of the low concentration diffusion regions extends under the gate electrode 6," citing Hirano Fig. 5, page 3, paragraph [0045]. Claim 16, as amended, recites in part "the first and second low concentration diffusion regions being separated from each other by a portion of the SOI film under the gate dielectric film." Applicant respectfully submits that Hirano Fig. 5 shows that regions 7N & 7P are not "separated from each other by a portion of the SOI film under the gate dielectric film." Accordingly, in addition to the reasons noted earlier, the rejection of claim 16 should be withdrawn.

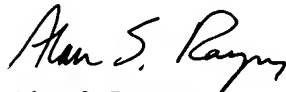
New dependent claims 17-18 have been added. Support for the amendment may be found in the specification at, for example, page 8, lines 14-20, page 9, lines 24-25, and in Fig. 1.

The Examiner made various comments in the Office Action concerning the obviousness of certain features of the present invention. Applicant respectfully disagrees. In addition, the Examiner's comments that have not been discussed above are deemed moot at this time in view of this response.

Applicant respectfully submits that the pending claims are in patentable form. Reexamination and reconsideration of the application and claims are respectfully requested. If, for any reason, the application is not in condition for allowance, the Examiner is requested to

telephone the undersigned to discuss the steps necessary to place the application into condition for allowance.

Respectfully submitted,



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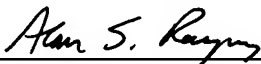
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